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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/707,865	11/07/2000	Bengt Ebbeson	30882US1	1443

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EXAMINER	
LEO, LEONARD R	

ART UNIT	PAPER NUMBER
3744	

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05/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/707,865	EBBESON, BENGT	
	Examiner	Art Unit	
	Leonard R. Leo	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-19,45 and 46* is/are pending in the application.

4a) Of the above claim(s) *8-12,15 and 17-19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-7,13,14,16,45 and 46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The amendment filed on August 30, 2004 has been entered. Claims 1, 5-19 and 45-46 are pending, and claims 8-12, 15 and 17-19 remain withdrawn from further consideration.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 5-7, 13-14, 16 and 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Labranque in view of Ebbeson, and further in view of Fujitani.

Labranque discloses al the claimed limitations except profiled bodies and a working pressure below atmospheric with zeolite and water.

Ebbeson (column 1, lines 13-26) discloses a sorption unit comprising zeolite bodies under vacuum and water as the working fluid for the purpose of providing heating or cooling in a refrigeration system.

Fujitani discloses a sorption unit comprising profiled bodies 7 of a sorption medium forming circular passageways for the purpose of increasing the surface absorption area to improve heat exchange efficiency.

Since Labranque, Ebbeson and Fujitani are both from the same field of endeavor and/or analogous art, the purpose disclosed by Ebbeson and Fujitani would have been recognized in the pertinent art of Labranque.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Labranque zeolite bodies under vacuum and water as the working fluid for the purpose of providing heating or cooling in a refrigeration system as recognized by Ebbeson, and employ in Labranque profiled bodies for the purpose of increasing the surface absorption area to improve heat exchange efficiency as recognized by Fujitani.

Regarding claim 14, the specific shape of the bodies is considered to be an obvious design expedient, producing no new and/or unexpected results and solving no stated problem.

Response to Arguments

Applicant's arguments have been fully considered but they are not persuasive.

The Examiner appreciates applicant's explanation of absorption versus adsorption. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ one "sorption medium" with another known "sorption medium", since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. Furthermore, each sorption medium operates with a respective working fluid, but operates in the same manner, i.e. the endothermic and exothermic reactions are employed in refrigeration systems.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

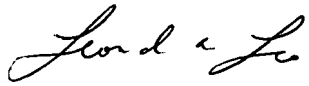
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard R. Leo whose telephone number is (571) 272-4916. The examiner can normally be reached on Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LEONARD R. LEO
PRIMARY EXAMINER
ART UNIT 3744

April 30, 2007

is disturbed which thereby disrupts the boundary layer. As mentioned above, the boundary layer blankets and otherwise insulates the plate fin from the cooling fluid.

FIG. **17***a* shows a heat exchanger similar to that illustrated in FIG. **16**, however, the plate fins have means of communication, in this case louvers **176** and slots **172**. The various plate fins are joined together by support means **175**. FIG. **17***b* shows a discrete exterior plate fin **171** having a slot **172**, and FIG. **17***c* shows a discrete interior plate fin having louvered sections **176** and textured regions **174**. The exterior plate fins **171** differ from the interior plate fins **173** in that they have no textured surface, nor do they have louvered sections **176** protruding therefrom. This is done for both aesthetics and structural reasons; the textured portions may be considered unsightly and louvers on the side plate fins may pose a risk of snagging. The benefit of this configuration is having a plate fin surface that not only disrupts the boundary layer, but also facilitates fluid communication as described above.

FIG. **18***a* is similar to that of **17***a*, however, the exterior plate fin **181** is similar to the interior plate fins. That is, both the interior plate fins and the exterior plate fins have textured regions **183** and louvered sections **182**. In addition, the heat exchange has several bars **185** which transverse the plate fins. Accordingly, the alignment of the textured regions **183** and louvered regions **182** provides for fluid flow without impediments between the interior and exterior fins.

FIGS. **19***a* and **19***b* illustrate a heat exchanger incorporating a plate fin **191** similar to that illustrated in FIG. **13***a*. The plate fin **191** comprises perforations having rectangular shaped openings **192** with 90 degree louvered sections **193**. FIG. **19***a* is a perspective view of a heat exchanger **190** comprised of individual plate fins **191**, where both the interior and exterior fins comprise the structure as illustrated in FIG. **19***b*. The fins **191** of the heat exchanger are joined together by support means **195**. Accordingly, the alignment of the plate fins **191** with the openings **192** causes the fluid passing along the fin to be disturbed, thereby disrupting the boundary layer and providing access to the cooling fluid.

FIG. **20***a* shows a heat exchanger having plate fins of varying cross-sectional area relative to the fluid flow, and FIG. **20***b* shows a discrete plate fin having the taper and connection means **204**. In regard to the taper, plate fin **201** decreases in cross-sectional area from the intake region **202** to the exhaust region **203**. Each plate fin **201** comprises connection elements **206** extending from the top surface of each plate fin **201**. As the plate fins **201** are assembled, the connection elements **206** form transverse bars **207** as illustrated in FIG. **20***a*. Accordingly, the taper reduces the friction on the fluid moving through the fin field thereby decreasing stagnation problems.

FIG. **21***a* shows a variation of the plate fin shape wherein a curved notch is removed from the plate fin **211**. FIG. **21***b* depicts a discrete plate fin **211** having a curved profile **212**. The curved profile correlates to frictions exponential relationship to velocity. The function behind this particular design is to reduce the drag on fluid entering from the intake region **213**, while increasing the friction on fluid entering from the exhaust region **214**. Each fin comprises connection elements **216** extending from the top surface of each plate fin **211**. As the plate fins **211** are assembled, the connection elements **216** align to form transverse bars **217**, as illustrated in FIG. **21***a*. The transverse bars **217** add structural integrity to the assembled heat exchanger, as well as act as a flow control means. More specifically, the transverse bars **217** act as a flow guide means for imparting a downward force on the fluid attempting to exit through the top surface area of the heat exchanger. Accordingly, this configuration reduces the flow of fluid in through the exhaust region.

FIG. **22***a* shows a heat exchanger having plate fins of varying length. The fins range from a long length **222** to a short length of **223** to from a clear region **224**. This region has very little frictional effect on the fluid therefore reducing the formation of stagnant regions within the fin field. It should be clear to those skilled in the art that a variety of configurations are possible to create a clear region **224**. It should also be obvious that the plate fins used in this configuration can incorporate any combination of the flow control means discussed herein. Suitable configuration include a flat plate fin **225** as shown in FIG. **22***b*, a slotted plate fin **226** as shown in FIG. **22***c*, and a perforated plate fin **227** as shown in FIG. **22***d*.

FIGS. **23***a* through **23***c* show a narrow channel heat exchanger **231** having a plate fin **233** with a section removed from it. As FIG. **23***c* shows, the removal results in a vacant area **232** which reduces the drag or friction on fluid moving through the channels. This results in reduced fluid stagnation and the problems associated therewith.

FIGS. **24***a* through **24***c* are similar to that of FIG. **23**, however, rather than having an entire section removed from the plate fin, a smaller section **243** is removed from the fin **242**, leaving a top portion **244** in tact. This configuration also provides for reduced drag, but also provides greater surface area for heat exchange. Furthermore, this area is located towards the top of the heat exchanger where stagnant fluid is generally not a problem.

FIGS. **25***a* through **25***c* show a narrow channel heat exchanger **251** similar to FIG. **24**, however, this design also has a top plate **252** having a certain profile. The top plate **252** disturbs the fluid bypassing the fin field **251** therefore slowing it down and creating a higher pressure above the fin field. This higher pressure tends to restrict egress of fluid from the fin field **251**, and may even facilitate fluid ingress.

FIG. **26***a* shows a heat exchanger having a plate fin made of segments **261**. Segments are spaced so that a gap **263** is formed between them. In this particular embodiment, a top bar **262** is used to join the two sections together as well as connect the various plate fin components together. FIG. **26***b* shows a discrete plate fin component having sections **261** and gaps **263**, and FIG. **26***c* shows a complementing plate fin arrangement having connection means **264** extending from a top surface of the plate fin. As mentioned above, when assembled in series, connection means **264** form transverse bars **262** that adds both integrity and improved heat conduction to the heat exchanger. The benefit of this design is that it allows for easy communication between the channels. Moreover, the plurality of top bars restricts the egress of fluid from the channels.

FIG. **27***a* shows a perspective view of a heat exchanger having plate fins comprised of different components. FIG. **27***b* illustrates one such discrete plate fin having connection means **275** extending from the top surface of the fin. In this embodiment, the plate fin has a high surface area component **271** along with low surface area components **272**. Securing the various low surface area components together are transverse bars **273**, and connecting the various high surface area components together is another transverse bar **274**. As shown in FIG. **27***a*, transverse bars **273** and **274** extend lengthwise across the heat exchanger, however bar **273** is significantly wider than bar **274**. Accordingly, the benefit of this design is that it allows for easy fluid communication in the front region of the heat exchanger where fluid stagnation